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January 25, 2021

Ms. Elizabeth Pletan  
Office of Regional Counsel (ORCDS)  
U.S. EPA, Region 6  
1201 Elm Street, Suite 500  
Dallas, Texas 75270

Re: Fansteel Facility- Port of Muskogee Liability as Current Owner-

Dear Elizabeth:

On behalf of the Fansteel Reorganized Debtor by and through David Sands its duly appointed and authorized Plan Administrator and FMRI, Inc. (collectively, "FMRI"), what follows is FMRI's position regarding the Port of Muskogee's ("Port") liability under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) for its share of response costs incurred and to be incurred to investigate and remediate the Fansteel Facility.

FMRI's position is based upon existing site technical documents, including the Port's 1999 Phase 1 report obtained during mediation, recent court cases, and EPA Guidance<sup>1</sup> ("Guidance").

## **Summary**

FMRI's position can be summarized as follows.

The Port, as the current owner of approximately 20 acres of the Fansteel Facility (Parcel A), failed to satisfy the requirements to qualify for the innocent landowner (ILO) defense under CERCLA Section 107(b)(3) and Section 101(35) in connection with its purchase of Parcel A from Fansteel in June of 1999.

The Port did not conduct "all appropriate inquiry" (AAI) prior to its purchase of Parcel A, and therefore, the Port failed to satisfy the threshold criteria for qualifying for the ILO defense. Moreover, once the Port had actual knowledge of the significant groundwater contamination on

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<sup>1</sup>Guidance used includes [\*Enforcement Discretion Guidance Regarding Statutory Criteria for Those Who May Qualify as CERCLA Bona Fide Prospective Purchasers, Contiguous Property Owners, or Innocent Landowners \("Common Elements"\)\*](#) dated July 29, 2019 and [\*Guidance on Landowner Liability under Section 107\(a\)\(1\) of CERCLA, De Minimis Settlements under Section 122\(g\)\(1\)\(B\) of CERCLA and Settlements with Prospective Purchasers of Contaminated Property dated June 6, 1989.\*](#)

Parcel A, it failed to implement “due care” requirements or take certain precautions required under the ILO defense with respect to such contamination.

Accordingly, as further discuss below, the Port is the current owner of Parcel A of the Fansteel Facility and does not qualify for the ILO defense. Therefore, the Port is liable under CERCLA for its share of response costs incurred and to be incurred to investigate and remediate the Fansteel Facility.

### **Background**

The Fansteel Facility is located at 10 Tantalum Place in Muskogee Oklahoma and is approximately 110 acres consisting of four Parcels (A-D) as defined in that certain Environmental Settlement Agreement (“ESA”) among Fansteel, Inc. FMRI, Inc. and the Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC) and the Oklahoma Department of Environmental Quality (ODEQ) (EPA, NRC and ODEQ collectively referred to as “Governmental Authorities”). The current owners of the four parcels are: Fansteel Parcels B & D (~ 80 acres); FMRI- Parcel C (~ 10 acres) and the Port -Parcel A (~ 20 acres).

As the Governmental Authorities are aware, Parcels A and B of the Fansteel Facility (Referred to as the Northwest Property) were included, along with Parcels C and D, in Fansteel’s Radioactive Material License (“License”) issued by the Nuclear Regulatory Commission (NRC). In order to remove Parcels A and B from the License so that these parcels can be sold, the NRC required that Fansteel perform an assessment of these two parcels for NRC review to determine whether, in the NRC’s opinion, these two parcels can be removed from the License.

In 1993, Fansteel’s consultant, Earth Sciences Consultants, Inc. (ESC) performed a remedial assessment (“Assessment”) of the entire Fansteel Site (see attached Figure 14 from the 1993 Remedial Assessment). A portion of this Assessment focused on the Northwest Property and included limited soil and groundwater sampling data and radiation surveys. This data was summarized in a separate report and submitted to the NRC for review. (“Northwest Remedial Assessment”)<sup>2</sup>. Based upon the data presented in the Northwest Remedial Assessment, the NRC removed Parcels A and B from Fansteel’s License by Amendment #5 dated, March 27, 1997.

In early 1999, the Port and Fansteel began negotiations related to the Port’s purchase of Parcel A. In May, 1999, the Port engaged ESC to conduct an environmental assessment of Parcel A.

At the time of these negotiations, ESC had been Fansteel’s environmental consultant for almost 10 years providing Fansteel with the necessary technical assistance to prepare a Decommissioning Plan required under Fansteel’s License. Such work included the investigation of the nature and extent of any radiological and non-radiological contamination present at the Fansteel Facility. In addition, ESC provided technical assistance to Fansteel regarding compliance with Fansteel’s

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<sup>2</sup> A copy of the Northwest Remedial Assessment, entitled, *Northwest Property Radiation Surveys* was provided to EPA as part of Fansteel’s Section 104(e) response in September, 2018.

NDPES discharge permit issued to Fansteel by ODEQ. Finally, ESC was Fansteel's technical representative interfacing with both the NRC and ODEQ and participating in the negotiations with the NRC and ODEQ over the scope of the investigation and remediation of any radiological and non-radiological contamination present at the Fansteel Facility.

The Port should have engaged an independent environmental consultant to perform the required environmental assessment. ESC, as Fansteel's (Seller's) consultant, lacked any independent professional judgement necessary to perform a satisfactory AAI assessment. Despite this obvious conflict of interest, the Port nonetheless engaged ESC on its behalf to conduct an environmental assessment of Parcel A.

ESC prepared a report entitled, "Technical Report Phase I Environmental Site Assessment Update Northwest Property Area, Muskogee, Muskogee County Oklahoma" dated May 17, 1999 (Technical Report)<sup>3</sup>. This Technical Report was intended to satisfy the AAI threshold criteria to qualify for the ILO defense.

ESC's Technical Report was an environmental site assessment update the purpose of which was to determine whether potential environmental concerns were associated with Parcel A. (See, Technical Report pg.2). In order to make this determination, ESC relied on very limited soil and groundwater data generated as part of Fansteel's Assessment described above. We have attached Figure 14 from the Assessment that indicates the locations of the specific soil borings and groundwater monitoring wells ESC evaluated. We have also attached Tables 2, 3 and 4 from the Northwest Remedial Assessment that provides the analytical data from these soil borings and groundwater monitoring wells.

The groundwater data upon which ESC relied to conclude that the Parcel A "did not present a significant environmental concern" was based upon four groundwater monitoring wells, none of which were located on Parcel A. (See, figure 14 of Remedial Assessment). Moreover, only the groundwater from two upgradient wells (MW51S and MW151D) were analyzed for full list of volatile organic compounds, including chlorinated solvents. (See tables 2,3 and 4 attached)

FMRI's position is that the ESC's Technical Report did not satisfy the appropriate AAI standard under CERCLA. In May, 1999, the AAI standard that was customarily used as the AAI practice for commercial/industrial property was the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessment: Phase I Environmental Assessment Process, designated as ASTM E 1527-97.

ESC's Technical Report did not meet the ASTM E 1527-97 standard for several reasons the most significant of which was because ESC relied on very limited soil and groundwater data it failed to identify and assess an extensive contaminated groundwater plume, consisting primarily of chlorinated solvents, that was present on Parcel A. A satisfactory AAI would have not relied on

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<sup>3</sup> A copy of the text portion of the Report is attached to this email and was provided by the Port to FMRI during the mediation in the Fansteel bankruptcy case.

such limited data and would have recommended more extensive soil and groundwater sampling data to determine whether Parcel A had been impacted by activities conducted on adjacent parcels.

The chlorinated solvent plume was subsequently discovered in 2006, seven years after the Port's purchase of Parcel A, as a result of a limited soil and groundwater investigation performed by ODEQ on behalf of the Port on Parcel B.

In addition to the failure to satisfy the customary AAI standard, the Port's inactions after it had actual knowledge of the extensive groundwater contamination plume underneath Parcel A does not satisfy the additional due care requirements of the ILO defense. To the best of FMRI's knowledge, the Port has not conducted any additional investigations or other proactive measures to minimize the risk to human health and the environment posed by the presence of an extensive groundwater contamination plume underneath its property.

Recognizing the Port's failure to meet the requirements to qualify for the ILO defense, FMRI issued the Port a settlement demand, including a proposed settlement agreement, that would resolve the Port's liability under CERCLA as the current owner of Parcel A in return for the payment of a sum certain. The Port rejected our settlement offer without comment and without making a counteroffer.

We understand that after the Port rejected our settlement offer in late October, 2020, the Port contacted the EPA indicating that it believes that it is not liable under CERCLA for its share of response costs because even though it is the current owner of Parcel A, it qualifies for the ILO defense.

### **Innocent Landowner Defense**

Given the date of the Port's purchase of Parcel A, the only landowner defense available to the Port is the ILO defense as set forth in CERCLA Section 107(b)(3), including the criteria set forth in CERCLA Section 101(35). EPA Guidance addresses the innocent landowner defense for purchasers that acquired property under the circumstances set forth in Section 101(35)(A)(i). Accordingly, our analysis below relies not only on the Guidance, but also the relevant court decisions addressing these specific aspects of the ILO defense.

### **Threshold Criteria**



The first ILO defense requirement that the Port must satisfy is the “Threshold Criteria” as detailed in the Guidance. The Threshold Criteria as set forth in Section 101(35) (A)(i), (B)(i) requires that the Port, prior to the acquisition of Parcel A, must have conducted all appropriate inquiry into the previous ownership and uses of the Parcel A in accordance with good commercial and customary standards and practices.

At the time of the Port’s purchase of Parcel A, we believe that the customary AAI standard was the ASTM International Standard E1527-97. A cursory review of ESC’s Technical Report indicates that this was the standard ESC apparently used. However, a closer review of the Technical Report does not support this conclusion. Even the title of the Technical Report suggests that it was simply an “update” of some previously performed assessment that we believe was the Northwest Remedial Assessment. It is unclear what ESC intended by the term “update”.

A properly conducted AAI assessment would undoubtedly have identified the potential for the groundwater underneath Parcel A to be impacted by activities conducted on adjacent parcels. However, relying on the very limited data from the Northwest Remedial Assessment, ESC erroneously concluded in the Technical Report that the “soil and groundwater data indicated that no radiological or chemical impacts had occurred to the soil and groundwater beneath the **entire** Northwest Property” (See, Technical Report pg. 4).

Accordingly, the ESC Technical Report does not satisfy the AAI Threshold Criteria set forth in Section 101(35)(A)(i), (B)(i), and the Port’s ILO defense fails from the outset.

### **Due Care Requirements**

Even if EPA were to somehow conclude that the ESC Technical Report satisfies the AAI Threshold Criteria, the Port is also required to satisfy certain due care requirements. As the Guidance indicates, “Congress intended landowners who seek to establish and maintain the ILO defense to act responsibly concerning the hazardous substances that are present on their property”.

The due care requirements under the ILO defense requires the exercise of due care with respect to the hazardous substances concerned taking into consideration the characteristics of such hazardous substance considering all the relevant facts and circumstances. More importantly, courts have concluded that this due care requirement requires that the landowner take some positive or affirmative steps when confronted with hazardous substances on its property.

In addition to the due care requirements under Section 107(b)(3)(a), the Port is required to also satisfy the requirements of Section 107(b)(3)(b). This Section requires that the Port take precautions against foreseeable acts or omissions of Fansteel and the consequences that could foreseeable result from such act or omissions.

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To the best of FMRI's knowledge, The Port has not exercised any due care with respect to the extensive chlorinated solvent plume underneath its property allowing further migration of the plume thereby increasing the risk to human health and the environment. Moreover, the Port has failed to take any precautions necessary against foreseeable acts or omissions.

Accordingly, the Port has likewise failed to satisfy the due care and precautionary requirements of the ILO defense under Section 107(b)(3), and the Port's ILO defense fails.

### **Conclusion**

In summary, we believe that after EPA evaluates the information provided in the attached report and the soil and groundwater data, as well as the reports FMRI has previously provided to EPA along with the lack of action by the Port once it was made aware of the contamination, EPA must conclude that the Port cannot establish that it qualifies for the ILO defense to CERCLA liability under the innocent landowner provision of CERCLA Section 107(b)(3) and the criteria of CERCLA Section 101(35).

Accordingly, the Port is liable under CERCLA for its share of response costs incurred or to be incurred to investigate and remediate the Fansteel Facility.

As we previously indicated to EPA, we intend to include the Port as a defendant in our soon-to-be filed complaint that would include that Port as a defendant along with certain of Fansteel's raw material suppliers.

If you would like to discuss this matter further, please contact me.

Sincerely yours,

Hill Clark PLC



Mark J. Steger

MJS: tb  
Attachments

**Table 2**  
**Soil Chemistry Data Summary**  
**Northwest Property Area**  
**Fansteel Metals**  
**Muskogee, Oklahoma**

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Sample Identification and Date							
Parameter	Units	Typical Range 2/1/93	Proposed	TCLP	B13 (0-0.5) 2/2/93	B13 (0.5-2.5) 2/2/93	B13 (24.5-27.0) 2/2/93
			RCRA	Action			
			Action	Level			
Total Analyses:							
Silver	mg/kg	NA <sup>(1)</sup>	200	NA	<2.1	<2.0	<2.4
Arsenic	mg/kg	0.10-97	80	NA	2.0	2.7	3.8
Barium	mg/kg	100-3000	4000	NA	220	130	140
Cadmium	mg/kg	NA	40	NA	2.8	3.6	3.2
Calcium	mg/kg	600-320000	NA	NA	1100	1500	1800
Chromium	mg/kg	3-2000	400	NA	16	27	14
Mercury	mg/kg	<0.01-4.6	20	NA	<0.059	<0.057	<0.062
Nickel	mg/kg	<5-700	2000	NA	17	15	17
Lead	mg/kg	<10-700	NA	NA	8.3	6.5	5.8
Antimony	mg/kg	<1-2.6	30	NA	<21	<20	<24
Selenium	mg/kg	<0.1-4.3	NA	NA	<0.24	<0.23	<0.25
Tin	mg/kg	<0.1-7.4	NA	NA	11	15	<12
Columbium	mg/kg	<10-100	NA	NA	11	11	10
Tantalum	mg/kg	NA	NA	NA	20	18	20
Fluoride	mg/kg	<10-1900	NA	NA	90	170	54
Gross Alpha	pCi/g	15.3	NA	NA	21±8	17±8	12±7
Gross Beta	pCi/g	20.5	NA	NA	26±6	22±6	24±6
ASTM Analysis:							
Ammonia	mg/kg NH3-N	NA	NA	NA	<2	<2	<2
pH	pH Units	NA	NA	2.0-12.5	6.84	7.22	7.42
Sulfate	mg/kg	NA	NA	NA	66	66	72
TCLP Metals:							
Silver	mg/l	NA	NA	5.0	.(2)	-	-
Arsenic	mg/l	NA	NA	5.0	-	-	-
Barium	mg/l	NA	NA	100	-	-	-
Cadmium	mg/l	NA	NA	1.0	-	-	-
Chromium	mg/l	NA	NA	5.0	-	-	-
Mercury	mg/l	NA	NA	0.2	-	-	-
Nickel	mg/l	NA	NA	NA	-	-	-
Lead	mg/l	NA	NA	5.0	-	-	-
Selenium	mg/l	NA	NA	1.0	-	-	-
TCLP Extraction Fluid Data:							
Extraction Fluid		NA	NA	NA	-	-	-
pH with Deionized Water	pH units	NA	NA	NA	-	-	-
pH After Addition of 1 Normal HCL	pH units	NA	NA	NA	-	-	-
pH of TCLP Extract	pH units	NA	NA	NA	-	-	-
Amount of Sample Extracted	g	NA	NA	NA	-	-	-
Volatile Organic Analyses:							
4-Methyl-2-pentanone (MIBK)	µg/kg	NA	4000	NA	<1500	<1500	<1600

See footnotes at end of table.

**Table 2**  
(Continued)

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		Sample Identification and Date				
Parameter	Units	B14	B14	B14	B57	B57
		(0-0.5)	(2.5-5.0)	(26.5-27.5)	(0-0.5)	(24.5-27.0)
		2/2/93	2/2/93	2/2/93	2/5/93	2/5/93
Total Analyses:						
Silver	mg/kg	<2.3	<2.1	<2.5	<2.5	<2.5
Arsenic	mg/kg	2.1	2.0	6.8	0.93	<0.25
Barium	mg/kg	66	58	70	75	180
Cadmium	mg/kg	<2.3	<2.1	<2.5	<2.5	3.1
Calcium	mg/kg	1200	1400	1800	1500	2800
Chromium	mg/kg	13	9.8	9.2	11	23
Mercury	mg/kg	<0.060	<0.057	<0.063	<0.06	<0.062
Nickel	mg/kg	11	<11	<12	<12	20
Lead	mg/kg	7.7	4.6	6.8	7.2	6.1
Antimony	mg/kg	<23	<21	<25	<25	<25
Selenium	mg/kg	<0.24	<0.23	<0.25	<0.25	<0.25
Tin	mg/kg	<11	<11	<12	<12	14
Columbium	mg/kg	12	9.0	10	5.0	8.7
Tantalum	mg/kg	17	12	24	5.0	11
Fluoride	mg/kg	110	170	300	84	200
Gross Alpha	pCi/g	28±8	20±7	17±7	19±8	16±8
Gross Beta	pCi/g	24±6	25±6	25±6	21±5	33±7
ASTM Analysis:						
Ammonia	mg/kg NH3-N	<2	<2	<2	<2	<2
pH	pH Units	6.68	6.85	6.52	6.07	7.30
Sulfate	mg/kg	320	130	72	52	130
TCLP Metals:						
Silver	mg/l	-	-	-	-	-
Arsenic	mg/l	-	-	-	-	-
Barium	mg/l	-	-	-	-	-
Cadmium	mg/l	-	-	-	-	-
Chromium	mg/l	-	-	-	-	-
Mercury	mg/l	-	-	-	-	-
Nickel	mg/l	-	-	-	-	-
Lead	mg/l	-	-	-	-	-
Selenium	mg/l	-	-	-	-	-
TCLP Extraction Fluid Data:						
Extraction Fluid		-	-	-	-	-
pH with Deionized Water	pH units	-	-	-	-	-
pH After Addition of 1 Normal HCL	pH units	-	-	-	-	-
pH of TCLP Extract	pH units	-	-	-	-	-
Amount of Sample Extracted	g	-	-	-	-	-
Volatile Organic Analyses:						
4-Methyl-2-pentanone (MIBK)	µg/kg	<1600	<1500	<1600	<1600	<1600

See footnotes at end of table.

**Table 2**  
(Continued)

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Parameter	Units	Sample Identification and Date				
		B57	MW-51S	MW-51S	MW-51S	MW-53S
		(29.5-32.0)	(0-2.0)	(14.5-17.0)	(27.0-29.5)	(0-0.5)
		2/5/93	4/1/91	4/1/91	4/1/91	2/11/93
<b>Total Analyses:</b>						
Silver	mg/kg	<2.6	<10	<10	<10	<2.4
Arsenic	mg/kg	0.38	0.6	2	0.4	2.6
Barium	mg/kg	58	<100	100	<100	60
Cadmium	mg/kg	<2.6	<10	<10	<10	<2.4
Calcium	mg/kg	1500	900	1800	1000	1400
Chromium	mg/kg	8.1	<10	17	<10	15
Mercury	mg/kg	<0.064	0.11	0.07	0.07	<0.060
Nickel	mg/kg	<13	<10	13	<10	<12
Lead	mg/kg	5.4	<10	<10	<10	11
Antimony	mg/kg	<26	<0.01	<10	<10	<24
Selenium	mg/kg	<0.26	<1	<1	<1	<0.24
Tin	mg/kg	<13	<100	<100	<100	<12
Columbium	mg/kg	8.9	36	52	30	6.0
Tantalum	mg/kg	15	9	16	5	8.5
Fluoride	mg/kg	170	-	-	-	220
Gross Alpha	pCi/g	11±6	2.4±0.7	1.5±0.6	1.4±0.5	38±8
Gross Beta	pCi/g	26±5	3.9±1.0	3.5±0.9	3.3±0.9	21±5
<b>ASTM Analysis:</b>						
Ammonia	mg/kg NH3-N	<2	<2	4	<2	2
pH	pH Units	7.42	-	-	-	5.99
Sulfate	mg/kg	68	<20	40	<20	44
<b>TCLP Metals:</b>						
Silver	mg/l	-	-	-	-	-
Arsenic	mg/l	-	-	-	-	-
Barium	mg/l	-	-	-	-	-
Cadmium	mg/l	-	-	-	-	-
Chromium	mg/l	-	-	-	-	-
Mercury	mg/l	-	-	-	-	-
Nickel	mg/l	-	-	-	-	-
Lead	mg/l	-	-	-	-	-
Selenium	mg/l	-	-	-	-	-
<b>TCLP Extraction Fluid Data:</b>						
Extraction Fluid		-	-	-	-	-
pH with Deionized Water	pH units	-	-	-	-	-
pH After Addition of 1 Normal HCL	pH units	-	-	-	-	-
pH of TCLP Extract	pH units	-	-	-	-	-
Amount of Sample Extracted	g	-	-	-	-	-
<b>Volatile Organic Analyses:</b>						
4-Methyl-2-pentanone (MIBK)	µg/kg	<1700	<50	<50	<50	<1600

See footnotes at end of table.

**Table 2**  
(Continued)

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Parameter	Units	Sample Identification and Date				
		MW-53S	MW-53S	MW-54S	MW-54S	MW-54S
		(23.0-25.0)	(25.0-27.0)	(0-0.05)	(2.0-4.5)	(24.5-27.0)
		2/11/93	2/11/93	2/11/93	2/11/93	2/11/93
Total Analyses:						
Silver	mg/kg	<2.4	<2.4	<2.5	<2.3	<2.4
Arsenic	mg/kg	1.2	2.1	3.0	7.1	3.6
Barium	mg/kg	70	60	89	74	68
Cadmium	mg/kg	<2.4	<2.4	4.0	<2.3	<2.4
Calcium	mg/kg	1900	1400	1500	1100	2100
Chromium	mg/kg	15	12	32	23	14
Mercury	mg/kg	<0.060	<0.061	<0.063	0.060	<0.059
Nickel	mg/kg	<12	17	<13	<12	14
Lead	mg/kg	9.3	8.0	18	6.9	5.9
Antimony	mg/kg	<24	<24	<25	<23	<24
Selenium	mg/kg	<0.24	<0.24	<0.25	<0.23	<0.24
Tin	mg/kg	<12	<12	23	<12	<12
Columbium	mg/kg	8.3	9.7	13	5.8	5.9
Tantalum	mg/kg	18	27	32	10	12
Fluoride	mg/kg	300	270	590	330	280
Gross Alpha	pCi/g	15±5	16±6	18±6	20±6	12±5
Gross Beta	pCi/g	32±6	28±5	22±5	24±5	21±5
ASTM Analysis:						
Ammonia	mg/kg NH3-N	<2	<2	<2	<2	<2
pH	pH Units	6.75	6.66	6.72	6.57	6.83
Sulfate	mg/kg	68	44	44	44	52
TCLP Metals:						
Silver	mg/l	-	-	<0.10	<0.10	-
Arsenic	mg/l	-	-	<0.10	<0.10	-
Barium	mg/l	-	-	<10	<10	-
Cadmium	mg/l	-	-	<0.10	<0.10	-
Chromium	mg/l	-	-	<0.10	<0.10	-
Mercury	mg/l	-	-	<0.010	<0.010	-
Nickel	mg/l	-	-	<1.0	<1.0	-
Lead	mg/l	-	-	<0.10	0.13	-
Selenium	mg/l	-	-	<0.10	<0.10	-
TCLP Extraction Fluid Data:						
Extraction Fluid		-	-	No. 1	No. 1	-
pH with Deionized Water	pH units	-	-	6.12	6.54	-
pH After Addition of 1 Normal HCL	pH units	-	-	1.66	1.63	-
pH of TCLP Extract	pH units	-	-	4.95	4.97	-
Amount of Sample Extracted	g	-	-	40.0	40.0	-
Volatile Organic Analyses:						
4-Methyl-2-pentanone (MIBK)	µg/kg	<1500	<1600	<1600	<1500	<1500

(1) NA = Not applicable.

(2) Dash denotes not analyzed.

Table 3  
Chemistry Data Summary  
Shallow Groundwater Zone  
Northwest Property Area  
Fansteel Metals  
Muskogee, Oklahoma

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Sample Identification and Date					
Parameter	Units	USEPA	MW-51S	MW-53S	MW-54S
		Drinking Water Standards (MCL) 3/1/93			
2/24/93 2/27/93 2/25/93					
General Chemistry:					
pH, Field	pH units	(1)	6.35	6.85	5.65
Specific Conductance, Field	µmhos/cm	-	380	550	450
Temperature, Field	°C	-	12.2	16.5	15
Oxygen, Dissolved	mg/l	-	6.2	2.1	2.9
Eh	mv	-	160	200	180
Total Analyses:					
Fluoride	mg/l	4	0.43	0.25	0.14
Ammonia	mg/l NO <sub>3</sub> -N	NA(2)	<0.10	<0.10	<0.10
Nitrate-Nitrite	mg/l NO <sub>3</sub> -N	10	0.87	6.3	2.3
Sulfate	mg/l	250	19	110	41
Gross Alpha	pCi/L	15	8±3	6±4	15±6
Gross Beta	pCi/L	NAV(3)	8±3	10±4	25±6
Metals:					
Silver, Total	µg/l	100	<6.84	<6.84	<6.84
Aluminum, Total	µg/l	200	1090	-	-
Arsenic, Total	µg/l	50	<1	3.88	<1
Barium, Total	µg/l	2000	79.6	99.5	327
Beryllium, Total	µg/l	NA	1.19	-	-
Calcium, Total	µg/l	NA	33100	24700	47600
Cadmium, Total	µg/l	5	18.1	7.17	4.42
Cobalt, Total	µg/l	NA	<8.54	-	-
Chromium, Total	µg/l	100	<10	12.8	<10
Copper, Total	µg/l	1000	12.6	-	-
Iron, Total	µg/l	NA	926	-	-
Mercury, Total	µg/l	2	<0.2	<0.2	<0.2
Potassium, Total	µg/l	NA	1850	-	-
Magnesium, Total	µg/l	NA	11800	-	-
Manganese, Total	µg/l	50	207	-	-
Sodium, Total	µg/l	NA	70400	-	-
Nickel, Total	µg/l	NA	<11.1	<11.1	27
Lead, Total	µg/l	15(4)	6.84	5.77	34.6
Antimony, Total	µg/l	NA	<3	<29.7	<29.7
Selenium, Total	µg/l	50	2.92	<0.8	<0.8
Tin, Total	µg/l	NA	<50	<50	<50
Thallium, Total	µg/l	NA	<4	-	-
Vanadium, Total	µg/l	NA	<5.17	-	-
Zinc, Total	µg/l	NA	20.4	-	-
Columbium, Total	µg/l	NA	<10	<100	20
Tantalum, Total	µg/l	NA	40	<100	40
Volatile Organics:					
Acetone	µg/l	NA	<10	-	-
Benzene	µg/l	5	<10	-	-
Bromodichloromethane	µg/l	NA	<10	-	-
Bromoform	µg/l	NA	<10	-	-
Bromomethane	µg/l	NA	<10	-	-
2-Butanone	µg/l	NA	<10	-	-
Carbon Disulfide	µg/l	NA	<10	-	-
Carbon Tetrachloride	µg/l	5	<10	-	-
Chlorobenzene	µg/l	100	<10	-	-

See footnotes at end of table.

Table 3  
(Continued)

Page 2 of 1

Sample Identification and Date					
Parameter	Units	USEPA	MW-51S	MW-53S	MW-54S
		Drinking			
		Water	Standards (MCL)	2/24/93	2/27/93
		3/1/93			
Volatile Organics, Continued:					
Dibromochloromethane	µg/l	NA	<10	-	-
Chloroethane	µg/l	NA	<10	-	-
Chloromethane	µg/l	NA	<10	-	-
Chloroform	µg/l	NA	<10	-	-
1,1-Dichloroethane	µg/l	NA	<10	-	-
1,2-Dichloroethane	µg/l	5	<10	-	-
1,1-Dichloroethene	µg/l	7	<10	-	-
1,2-Dichloroethene	µg/l	NA	<10	-	-
1,2-Dichloropropane	µg/l	5	<10	-	-
Cis-1,3-Dichloropropene	µg/l	NA	<10	-	-
Trans-1,3-Dichloropropene	µg/l	NA	<10	-	-
Ethylbenzene	µg/l	700	<10	-	-
2-Hexanone	µg/l	NA	<10	-	-
Methylene Chloride	µg/l	NA	<10	-	-
4-Methyl-2-pentanone	µg/l	2000 <sup>(5)</sup>	<10	<10	<10
Styrene	µg/l	100	<10	-	-
1,1,2,2-Tetrachloroethane	µg/l	NA	<10	-	-
Tetrachloroethene	µg/l	5	<10	-	-
Toluene	µg/l	1000	<10	-	-
1,1,1-Trichloroethane	µg/l	200	<10	-	-
1,1,2-Trichloroethane	µg/l	NA	<10	-	-
Trichloroethene	µg/l	5	<10	-	-
Vinyl Chloride	µg/l	2	<10	-	-
Xylenes, Total	µg/l	10000	<10	-	-
Semivolatile Organics:					
Acenaphthene	µg/l	NA	<10	-	-
Acenaphthylene	µg/l	NA	<10	-	-
Bis(2-chloroethyl)ether	µg/l	NA	<10	-	-
Bis(2-chloroethoxy)methane	µg/l	NA	<10	-	-
Bis(2-chloroisopropyl)ether	µg/l	NA	<10	-	-
Bis(2-ethylhexyl)phthalate	µg/l	NA	<10	-	-
Benzo(a)pyrene	µg/l	NA	<10	-	-
Benzo(a)anthracene	µg/l	NA	<10	-	-
Benzo(b)fluoranthene	µg/l	NA	<10	-	-
Benzo(g,h,i)perylene	µg/l	NA	<10	-	-
Benzo(k)fluoranthene	µg/l	NA	<10	-	-
4-Bromophenyl Phenyl Ether	µg/l	NA	<10	-	-
Butylbenzyl Phthalate	µg/l	NA	<10	-	-
Carbazole	µg/l	NA	<10	-	-
Chrysene	µg/l	NA	<10	-	-
4-Chloroaniline	µg/l	NA	<10	-	-
2-Chloronaphthalene	µg/l	NA	<10	-	-
2-Chlorophenol	µg/l	NA	<10	-	-
4-Chlorophenyl Phenyl Ether	µg/l	NA	<10	-	-
o-Cresol	µg/l	NA	<10	-	-
p-Cresols	µg/l	NA	<10	-	-
Dibenzo(a,h)anthracene	µg/l	NA	<10	-	-
Dibenzofuran	µg/l	NA	<10	-	-
2,4-Dichlorophenol	µg/l	NA	<10	-	-
1,2-Dichlorobenzene	µg/l	NA	<10	-	-
1,3-Dichlorobenzene	µg/l	NA	<10	-	-
1,4-Dichlorobenzene	µg/l	NA	<10	-	-

See footnotes at end of table.



Table 3  
(Continued)

Page 3 of 1

Sample Identification and Date					
Parameter	Units	USEPA	MW-51S	MW-53S	MW-54S
		Drinking			
		Water			
		Standards (MCL)			
		3/1/93	2/24/93	2/27/93	2/25/93
Semivolatile Organics, Continued:					
3,3-Dichlorobenzidine	µg/l	NA	<10	-	-
Diethyl Phthalate	µg/l	NA	<10	-	-
Dimethyl Phthalate	µg/l	NA	<10	-	-
2,4-Dimethylphenol	µg/l	NA	<10	-	-
Di-N-butyl Phthalate	µg/l	NA	<10	-	-
4,6-Dinitro-o-cresol	µg/l	NA	<50	-	-
2,4-Dinitrotoluene	µg/l	NA	<10	-	-
2,6-Dinitrotoluene	µg/l	NA	<10	-	-
Di-N-octyl Phthalate	µg/l	NA	<10	-	-
2,4-Dinitrophenol	µg/l	NA	<50	-	-
Fluoranthene	µg/l	NA	<10	-	-
Fluorene	µg/l	NA	<10	-	-
Hexachlorocyclopentadiene	µg/l	NA	<10	-	-
Hexachlorobenzene	µg/l	NA	<10	-	-
Hexachlorobutadiene	µg/l	NA	<10	-	-
Hexachloroethane	µg/l	NA	<10	-	-
Indeno(1,2,3-c,d)pyrene	µg/l	NA	<10	-	-
Isophorone	µg/l	NA	<10	-	-
2-Methylnaphthalene	µg/l	NA	<10	-	-
N-Nitrosodiphenylamine	µg/l	NA	<10	-	-
N-Nitrosodi-n-propylamine	µg/l	NA	<10	-	-
Naphthalene	µg/l	NA	<10	-	-
2-Nitroaniline	µg/l	NA	<50	-	-
3-Nitroaniline	µg/l	NA	<50	-	-
4-Nitroaniline	µg/l	NA	<50	-	-
Nitrobenzene	µg/l	NA	<10	-	-
2-Nitrophenol	µg/l	NA	<10	-	-
4-Nitrophenol	µg/l	NA	<50	-	-
p-chloro-m-cresol	µg/l	NA	<10	-	-
Pentachlorophenol	µg/l	NA	<50	-	-
Phenanthrene	µg/l	NA	<10	-	-
Phenol	µg/l	NA	<10	-	-
Pyrene	µg/l	NA	<10	-	-
2,4,5-Trichlorophenol	µg/l	NA	<50	-	-
2,4,6-Trichlorophenol	µg/l	NA	<10	-	-
1,2,4-Trichlorobenzene	µg/l	NA	<10	-	-

(1) Dash denotes not applicable.

(2) NA = Not applicable.

(3) NAV = Not available.

(4) No MCL in effect. Represents action level for lead at the tap of a drinking water supply.

(5) Indicates Oklahoma state maximum concentration.

**Table 4**  
**Chemistry Data Summary**  
**Deep Groundwater Zone**  
**Northwest Property Area**  
**Fansteel Metals**  
**Muskogee, Oklahoma**

Page 1 of 3

Page 1 of 1

Sample Identification and Date							
Parameter	Units	USEPA	MW-151D	MW-151D	MW-151D	MW-151D	MW-151D
		Drinking Water Standards (MCL) 3/1/93	3/3/93	3/25/93	4/22/93	4/30/93	5/3/93
General Chemistry:							
pH, Field	pH units	.(1)	9.15	-	-	-	-
Specific Conductance, Field	µmhos/cm	-	550	-	-	-	-
Temperature, Field	°C	-	17	-	-	-	-
Oxygen, Dissolved	mg/l	-	5.1	-	-	-	-
Eh	mv	-	140	-	-	-	-
Total Analyses:							
Fluoride	mg/l	4	0.34 <sup>(2)</sup>	-	-	-	-
Ammonia	mg/l NO <sub>3</sub> -N	NA <sup>(3)</sup>	<0.10	-	-	-	-
Nitrate-Nitrite	mg/l NO <sub>3</sub> -N	10	10	-	-	-	-
Sulfate	mg/l	250	5.9	-	-	-	-
Gross Alpha	pCi/L	15	26±11	1±0.1	3±0.3	2±0.1	-
Gross Beta	pCi/L	NAV <sup>(4)</sup>	52±11	18±0.6	16±1	22±1	-
Metals:							
Silver, Total	µg/l	100	<6.84	-	-	-	-
Aluminum, Total	µg/l	200	3980	-	-	-	-
Arsenic, Total	µg/l	50	120	-	-	-	-
Barium, Total	µg/l	2000	75.6	-	-	-	-
Beryllium, Total	µg/l	NA	1.41	-	-	-	-
Calcium, Total	µg/l	NA	20100	-	-	-	-
Cadmium, Total	µg/l	5	6.3	-	-	-	-
Cobalt, Total	µg/l	NA	<8.54	-	-	-	-
Chromium, Total	µg/l	100	15.1	-	-	-	-
Copper, Total	µg/l	1000	26.3	-	-	-	-
Iron, Total	µg/l	NA	6440	-	-	-	-
Mercury, Total	µg/l	2	<0.2	-	-	-	-
Potassium, Total	µg/l	NA	8550	-	-	-	-
Magnesium, Total	µg/l	NA	2220	-	-	-	-
Manganese, Total	µg/l	50	144	-	-	-	-
Sodium, Total	µg/l	NA	130000	-	-	-	-
Nickel, Total	µg/l	NA	<11.1	-	-	-	-
Lead, Total	µg/l	15 <sup>(5)</sup>	38.8	-	-	-	-
Antimony, Total	µg/l	NA	38.2	-	-	-	-
Selenium, Total	µg/l	50	4.78	-	-	-	-
Tin, Total	µg/l	NA	<50	-	-	-	-
Thallium, Total	µg/l	NA	<4	-	-	-	-
Vanadium, Total	µg/l	NA	15	-	-	-	-
Zinc, Total	µg/l	NA	31.8	-	-	-	-
Columbium, Total	µg/l	NA	<100	-	-	-	-
Tantalum, Total	µg/l	NA	<100	-	-	-	-
Volatile Organics:							
Acetone	µg/l	NA	-	-	-	-	<10
Benzene	µg/l	5	-	-	-	-	<10
Bromodichloromethane	µg/l	NA	-	-	-	-	<10
Bromoform	µg/l	NA	-	-	-	-	<10
Bromomethane	µg/l	NA	-	-	-	-	<10
2-Butanone	µg/l	NA	-	-	-	-	<10
Carbon Disulfide	µg/l	NA	-	-	-	-	<10
Carbon Tetrachloride	µg/l	5	-	-	-	-	<10
Chlorobenzene	µg/l	100	-	-	-	-	<10

See footnotes at end of table.

**Table 4**  
**(Continued)**

		Sample Identification and Date					
		USEPA Drinking Water Standards (MCL)	MW-151D	MW-151D	MW-151D	MW-151D	MW-151D
Parameter	Units	3/1/93	3/3/93	3/25/93	4/22/93	4/30/93	5/3/93
Volatile Organics, Continued:							
Dibromochloromethane	µg/l	NA	-	-	-	-	<10
Chloroethane	µg/l	NA	-	-	-	-	<10
Chloromethane	µg/l	NA	-	-	-	-	<10
Chloroform	µg/l	NA	-	-	-	-	<10
1,1-Dichloroethane	µg/l	NA	-	-	-	-	<10
1,2-Dichloroethane	µg/l	5	-	-	-	-	<10
1,1-Dichloroethene	µg/l	7	-	-	-	-	<10
1,2-Dichloroethene	µg/l	NA	-	-	-	-	<10
1,2-Dichloropropane	µg/l	5	-	-	-	-	<10
Cis-1,3-Dichloropropene	µg/l	NA	-	-	-	-	<10
Trans-1,3-Dichloropropene	µg/l	NA	-	-	-	-	<10
Ethylbenzene	µg/l	700	-	-	-	-	<10
2-Hexanone	µg/l	NA	-	-	-	-	<10
Methylene Chloride	µg/l	NA	-	-	-	-	<10
4-Methyl-2-pentanone	µg/l	2000(6)	<10	-	-	-	<10
Styrene	µg/l	100	-	-	-	-	<10
1,1,2,2-Tetrachloroethane	µg/l	NA	-	-	-	-	<10
Tetrachloroethene	µg/l	5	-	-	-	-	<10
Toluene	µg/l	1000	-	-	-	-	<10
1,1,1-Trichloroethane	µg/l	200	-	-	-	-	<10
1,1,2-Trichloroethane	µg/l	NA	-	-	-	-	<10
Trichloroethene	µg/l	5	-	-	-	-	<10
Vinyl Chloride	µg/l	2	-	-	-	-	<10
Xylenes, Total	µg/l	10000	-	-	-	-	<10
Semivolatile Organics:							
Acenaphthene	µg/l	NA	-	-	-	-	<10
Acenaphthylene	µg/l	NA	-	-	-	-	<10
Bis(2-chloroethyl)ether	µg/l	NA	-	-	-	-	<10
Bis(2-chloroethoxy)methane	µg/l	NA	-	-	-	-	<10
Bis(2-chloroisopropyl)ether	µg/l	NA	-	-	-	-	<10
Bis(2-ethylhexyl)phthalate	µg/l	NA	-	-	-	-	<10
Benzo(a)pyrene	µg/l	NA	-	-	-	-	<10
Benzo(a)anthracene	µg/l	NA	-	-	-	-	<10
Benzo(b)fluoranthene	µg/l	NA	-	-	-	-	<10
Benzo(g,h,i)perylene	µg/l	NA	-	-	-	-	<10
Benzo(k)fluoranthene	µg/l	NA	-	-	-	-	<10
4-Bromophenyl Phenyl Ether	µg/l	NA	-	-	-	-	<10
Butylbenzyl Phthalate	µg/l	NA	-	-	-	-	<10
Carbazole	µg/l	NA	-	-	-	-	<10
Chrysene	µg/l	NA	-	-	-	-	<10
4-Chloroaniline	µg/l	NA	-	-	-	-	<10
2-Chloronaphthalene	µg/l	NA	-	-	-	-	<10
2-Chlorophenol	µg/l	NA	-	-	-	-	<10
4-Chlorophenyl Phenyl Ether	µg/l	NA	-	-	-	-	<10
o-Cresol	µg/l	NA	-	-	-	-	<10
p-Cresols	µg/l	NA	-	-	-	-	<10
Dibenzo(a,h)anthracene	µg/l	NA	-	-	-	-	<10
Dibenzofuran	µg/l	NA	-	-	-	-	<10
2,4-Dichlorophenol	µg/l	NA	-	-	-	-	<10
1,2-Dichlorobenzene	µg/l	NA	-	-	-	-	<10
1,3-Dichlorobenzene	µg/l	NA	-	-	-	-	<10
1,4-Dichlorobenzene	µg/l	NA	-	-	-	-	<10

See footnotes at end of table.

Table 4  
(Continued)

Sample Identification and Date							
Parameter	Units	USEPA	MW-151D	MW-151D	MW-151D	MW-151D	MW-151D
		Drinking Water Standards (MCL) 3/1/93					
Semivolatile Organics, Continued:							
3,3-Dichlorobenzidine	µg/l	NA	-	-	-	-	<10
Diethyl Phthalate	µg/l	NA	-	-	-	-	<10
Dimethyl Phthalate	µg/l	NA	-	-	-	-	<10
2,4-Dimethylphenol	µg/l	NA	-	-	-	-	<10
Di-N-butyl Phthalate	µg/l	NA	-	-	-	-	<10
4,6-Dinitro-o-cresol	µg/l	NA	-	-	-	-	<50
2,4-Dinitrotoluene	µg/l	NA	-	-	-	-	<10
2,6-Dinitrotoluene	µg/l	NA	-	-	-	-	<10
Di-N-octyl Phthalate	µg/l	NA	-	-	-	-	<10
2,4-Dinitrophenol	µg/l	NA	-	-	-	-	<50
Fluoranthene	µg/l	NA	-	-	-	-	<10
Fluorene	µg/l	NA	-	-	-	-	<10
Hexachlorocyclopentadiene	µg/l	NA	-	-	-	-	<10
Hexachlorobenzene	µg/l	NA	-	-	-	-	<10
Hexachlorobutadiene	µg/l	NA	-	-	-	-	<10
Hexachloroethane	µg/l	NA	-	-	-	-	<10
Indeno(1,2,3-c,d)pyrene	µg/l	NA	-	-	-	-	<10
Isophorone	µg/l	NA	-	-	-	-	<10
2-Methylnaphthalene	µg/l	NA	-	-	-	-	<10
N-Nitrosodiphenylamine	µg/l	NA	-	-	-	-	<10
N-Nitrosodi-n-propylamine	µg/l	NA	-	-	-	-	<10
Naphthalene	µg/l	NA	-	-	-	-	<10
2-Nitroaniline	µg/l	NA	-	-	-	-	<50
3-Nitroaniline	µg/l	NA	-	-	-	-	<50
4-Nitroaniline	µg/l	NA	-	-	-	-	<50
Nitrobenzene	µg/l	NA	-	-	-	-	<10
2-Nitrophenol	µg/l	NA	-	-	-	-	<10
4-Nitrophenol	µg/l	NA	-	-	-	-	<50
p-chloro-m-cresol	µg/l	NA	-	-	-	-	<10
Pentachlorophenol	µg/l	NA	-	-	-	-	<50
Phenanthrene	µg/l	NA	-	-	-	-	<10
Phenol	µg/l	NA	-	-	-	-	<10
Pyrene	µg/l	NA	-	-	-	-	<10
2,4,5-Trichlorophenol	µg/l	NA	-	-	-	-	<50
2,4,6-Trichlorophenol	µg/l	NA	-	-	-	-	<10
1,2,4-Trichlorobenzene	µg/l	NA	-	-	-	-	<10

(1) Dash denotes not applicable.

(2) Fluoride concentration was resampled on April 2, 1993 for comparison of results indicated on March 3, 1993 for MW-151D. The March 3 result was 2.3 milligrams per liter respectively.

(3) NA = Not applicable.

(4) NAV = Not available.

(5) No MCL in effect. Represents action level for lead at the tap of a drinking water supply.

(6) Indicates Oklahoma state maximum concentration.

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**Technical Report  
Phase I Environmental  
Site Assessment Update**

**Northwest Property Area  
Muskogee, Muskogee County, Oklahoma**

**Fansteel Inc.  
Muskogee, Oklahoma**

**Project No. 5371  
May 17, 1999**



**Earth Sciences Consultants, Inc.**

*Providing Environmental Consulting Services Since 1979*

**Privileged and Confidential**

**Technical Report  
Phase I Environmental  
Site Assessment Update**

**Northwest Property Area  
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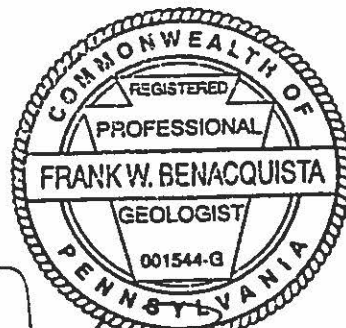


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- Appendix C – Historical Aerial Photograph
- Appendix D – Historical Topographic Map
- Appendix E – Fansteel's Materials License SMB-911
- Appendix F – Legal Description



**Privileged and Confidential**

**Technical Report  
Phase I Environmental Site Assessment Update  
Northwest Property Area  
Fansteel Inc.  
Muskogee, Muskogee County, Oklahoma**

**1.0 Introduction**

This technical report documents the confidential Phase I environmental site assessment update conducted by Earth Sciences Consultants, Inc. (Earth Sciences) of a portion of the Fansteel Inc. (Fansteel) "Northwest Property Area" (Northwest Property) for the Port of Muskogee. The Fansteel facility and the Northwest Property are located at Number Ten Tantalum Place, Muskogee, Oklahoma. A site location map is presented as Figure 1 in Appendix A. This assessment is furnished to the Port of Muskogee to aid in understanding the environmental condition of the site. This report may not be relied upon by the Port of Muskogee in any other connection and it may not be relied upon by any other person for any purpose. This assessment may not be assigned, quoted, or used without the express prior written consent of Earth Sciences.

A Phase I environmental site assessment estimates the potential for environmental problems to exist at a site and provides a framework should a more comprehensive site investigation be required. The Phase I environmental site assessment includes the following tasks:

- Task 1 – Review of available public records including, but not limited to, current and historical documents and interviews with relevant regulatory agency representatives and municipal officers.
- Task 2 – Interviews with available and knowledgeable past or present facility employees.
- Task 3 – Nonintrusive site observations.
- Task 4 – Preparation of a technical report.

The Phase I assessment begins with a review of information for the existing site and the surrounding property. This information is examined for indications of historical site usage or industrial practices which may have resulted in environmental concerns. In addition, local regulators or other personnel knowledgeable of the site's history are contacted. A site visit is then conducted to visually inspect the property, buildings, and adjacent land for evidence of current or past uses which may pose an

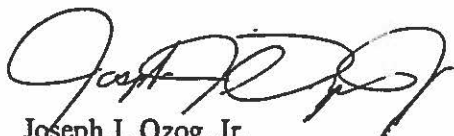
environmental concern. Additionally, Earth Sciences reviewed and incorporated findings from the following investigations performed by Earth Sciences for the Northwest Property:

- Remedial Assessment – Northwest Property Area. Fansteel Metals, Muskogee, Oklahoma. June 1993, Volume 1 (Earth Sciences Project No. 111).
- Radiation Survey and Remedial Assessment – Northwest Property Area. Fansteel, Inc., Muskogee, Oklahoma. May 1994 (Earth Sciences Project No. 111).
- Remedial Assessment. Fansteel Metals, Muskogee, Oklahoma. February 1991, Revised July 1992 (Earth Sciences Project No. PO111).

The results of these efforts are then presented in a report. The findings of the Phase I assessment may indicate the need for a more detailed and/or intrusive assessment such as sampling and analysis of environmental or building media. In such a case, the initiation of a Phase II environmental site assessment may be required in order to confirm the presence of environmental concerns and subsequently delineate and quantify the areas of environmental concern.

The purpose of this Phase I assessment update was to determine whether potential environmental concerns were associated with the subject property. The scope of this assessment was defined in Earth Sciences' April 16, 1999 proposal to Mr. Scott Robinson (Port Director - Port of Muskogee) and confirmed with Mr. Robinson's written authorization to begin the work. Specifically included in the work scope for this project were a review of available records, a visual inspection of the site, and interviews with available and knowledgeable personnel.

Respectfully submitted,



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Assistant Project Scientist



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JJO/FWB:cak

Project No. 5371  
May 17, 1999

## 2.0 Site Description

### 2.1 Location and Legal Description

*Site Name:* Fansteel Inc. – Northwest Property Area

*Site Address:* Number Ten Tantalum Place, Muskogee, Oklahoma

Legal description of the subject property is provided in Appendix F.

### 2.2 Site and Vicinity Characteristics

The subject site consists of a “L”-shaped parcel of land encompassing approximately 19.5 acres. The subject property is a portion of a much larger parcel of land that consists of 35 acres and is referred to as the Northwest Property owned by Fansteel. The subject property is located between Oklahoma State Route 165 and the west bank of the Arkansas River, near the town of Muskogee. The subject property is a vacant and lightly to moderately vegetated with grass and trees. The surrounding properties consist of state and local roadways, other portions of the Fansteel property, the Arkansas River, and an industrial park. Figure 2 in Appendix A presents the layout of the subject property.

#### 2.2.1 Site Structures

At the time of this site investigation, no structures either temporary or permanent were observed on the subject property.

#### 2.2.2 Roads and Paved Areas

Access to the subject property is provided via an asphalt-paved parking area adjoining the south side of the subject property.

#### 2.2.3 Site Utilities

The subject site is currently vacant and undeveloped and is not provided with public utility service. However, local services for natural gas, electric, water, and sewage can be accessed from the adjoining properties.

### 2.3 Current Uses of the Subject Property

Currently, the subject property is owned by Fansteel and is vacant with some light to dense vegetation (grass and trees). No production, manufacturing, or repair operations are currently being conducted on the subject property.

#### 2.4 Past Uses of the Subject Property

According to available historic information and a site reconnaissance, the subject property has been owned by Fansteel since 1956. Prior to Fansteel's purchase of the subject property, the property was vacant undeveloped land. The subject property encompasses approximately 19.5 acres in the northern portion of a larger parcel of land, collectively referred to as the Northwest Property. The Northwest Property consists of approximately 35 acres of land. Fansteel's operations were conducted on the remaining 15.5 acres (southern portion) of the Northwest Property, beginning in 1957 and continuing through 1990, when activities were terminated. Operations since 1990 have consisted of environmental monitoring; maintenance of buildings, grounds, and equipment remaining on the southern portion of the Northwest Property; and cleanup of operating areas. Operations previously conducted on the southern portion of the Northwest Property consisted of the processing of nonradioactive tantalum and columbium powder. The tantalum and columbium powders were pressed into shapes and sintered into a metal. The sintered products were either sold as is or further refined prior to sale by electron beam melting. The operations conducted on the southern portion of the Northwest Property were conducted in each of the structures. Some storage of the raw materials, which contained radioactive substances (containerized ores, ore concentrations, and slags) did take place in a warehouse portion of one of the buildings and outside the building. All of Fansteel's operations, and storage of radioactive and nonradioactive materials, were confined to the southern portion of the Northwest Property. No storage of radioactive and nonradioactive materials and none of the above-mentioned operations were conducted on the subject property.

In 1993, Earth Sciences performed a series of environmental surveys on the entire Northwest Property for the presence of radioactive materials or contamination from Fansteel's former operations. These surveys consisted of field instrument readings of surface/shallow soils and building media and the collection of soil and groundwater samples to determine the presence and concentration of any radioactivity and chemical contamination from former plant operations. Field instrument measurements and laboratory analyses of the surface/shallow soils were used to detect and quantify radioactivity in the entire Northwest Property.

Based on the laboratory analyses, no radiological or chemical impacts have occurred to the soils or groundwater beneath the entire Northwest Property. The land and building radiation survey results indicate that the entire Northwest Property satisfies the requirements for release from Fansteel's Nuclear Regulatory Commission (NRC) Materials License for unrestricted use.

## 2.5 Current and Past Uses of Contiguous Properties

### 2.5.1 Current Uses of Adjoining Properties

Currently, the usage of the surrounding adjoining properties consist of the following:

- *North:* Don Cayo Street, followed by Zapata Bottle Cap Manufacturing Company.
- *West:* NE 46<sup>th</sup> Street, followed by Oklahoma S.R. 165.
- *East:* A portion of the Fansteel facility (Sludge Reclaiming Plant).
- *South:* A portion of the Fansteel facility (Vacant Buildings).

The Fansteel facility located east/southeast of the subject property is currently undergoing environmental monitoring and remediation.

### 2.5.2 Past Uses of Adjoining Properties

According to available historic information, prior to development, the surrounding area to the north and west consisted of undeveloped land. The Fansteel facility located east/southeast and south of the subject property was originally constructed in 1956. Prior to Fansteel's purchase of property east/southeast and south of the subject property, the property was undeveloped land. Operations began in 1957 and continued through 1990 when operations were terminated. The Fansteel facility east/southeast and south of the subject site was constructed for the production of tantalum and columbium metal products. Operations conducted in the portion of the Fansteel facility east and southeast of the subject site consisted of the following: extraction of tantalum and columbium from raw ores and slags that contained uranium and thorium (naturally occurring radioactive trace constituents); storage of solid residues from the ore digestion process was stored in impoundments located on the site; and treatment followed by discharge of liquid wastes. The process that extracted the tantalum and columbium produced an intermediate product (nonradioactive tantalum and columbium powders). Operations conducted on the portion of the Fansteel facility south of the subject property consisted of the pressing and sintering of nonradioactive tantalum and columbium powders.

### 3.0 Records Review

#### 3.1 Standard Environmental Record Sources, Federal and State

Earth Sciences contracted the services of Environmental Data Resources, Inc. (EDR) to search both state and federal environmental databases in an attempt to identify potential concerns that may be associated with either the subject site and/or surrounding properties. A copy of the EDR database report is presented in Appendix B. The federal databases searched by EDR included the following:

- National Priorities List (NPL)
- Comprehensive Environmental Response, Compensation, and Liability Information System list
- Resource Conservation and Recovery Act (RCRA) treatment, storage, and disposal facilities list
- RCRA generators list
- RCRA Administrative Action Tracking System
- Emergency Response Notification Systemlist
- Polychlorinated Biphenyl (PCB) Activity Database
- NPL Liens (Federal Superfund Liens)
- Toxic Substances Control Act
- Material Licensing Tracking System
- Corrective Action Report
- Records of Decision
- Comprehensive Environmental Response, Compensation, and Liability Act Consent Decrees
- Hazardous Material Information Reporting System
- Toxic Chemical Release Information System

EDR also searched state database files. The state database search included the following:

- State hazardous waste site list
- State landfill and/or solid waste facility
- State leaking underground storage tank (LUST) list
- Summary of all registered underground storage tanks (UST) and aboveground storage tanks (AST)
- Spill Incidents

EDR performed a search of the above databases and prepared a list of all sites (including the subject site) that were found to be within the American Society for Testing and Materials (ASTM) E 1527-94 specified search radius around the subject site for Earth Sciences' review and inclusion in this report.

### 3.1.1 Subject Site

The vacant undeveloped parcel of land located in the northern portion of Fansteel's Northwest Property at Number Ten Tantalum Place, Muskogee, Oklahoma was not identified in any of the databases searched by EDR.

### 3.1.2 Facilities of Potential Concern

Earth Sciences completed a review of the EDR database information. EDR identified only one site within the search radius as being present in the environmental database. The Former 7-11 facility was identified in the UST and LUST databases and is located at 3600 E. Shawnee Road, over one-quarter mile south of the subject property. Based on the site reconnaissance of the subject site and the surrounding area, the Former 7-11 facility is located approximately less than one-quarter mile south of the subject property. The Oklahoma Corporation Commission (OCC) requires that all facilities that maintain USTs register those tanks. According to the UST database, the Former 7-11 facility currently owns one 4,030-gallon gasoline UST and one 10,152-gallon gasoline UST, which are permanently out of use. No information was available on any spill prevention or leak detection equipment utilized for the operation of these USTs.

The OCC maintains lists of USTs that have experienced leaks or spills related to their operation. According to the LUST database, the Former 7-11 facility experienced a release from a regulated UST. The status of this release has been closed as of November 1993.

The Former 7-11 facility is located hydrogeologically downgradient from the subject property. Any releases from these USTs would have very minimal, if any, environmental impact on the soils and groundwater beneath the subject property.

### 3.1.3 Orphan Sites

Orphan sites are those sites that are located in the same city, county, or zip code as the subject site but cannot be accurately located due to inaccurate address information. Four orphan sites were identified by EDR in the vicinity of the subject property. Earth Sciences' personnel performed a reconnaissance of the site area and determined that none of the orphan sites identified by EDR were in the direct vicinity of the subject site.



### 3.2 Physical Setting Sources

Please refer to Figure 1 which illustrates the location of the site on a current U.S. Geological Survey 7.5-minute topographic map.

### 3.3 Site Geology

#### 3.3.1 Geologic Setting

The city of Muskogee, Oklahoma is located in the unglaciated Osage Section of the Central Lowlands Physiographic Province. The eastern boundary of the section is delineated by the lapping of westward dipping Pennsylvanian rocks onto the western edge of the Ozark and the Ouachita uplifts. On the south, the Osage Section abuts the Arkansas Valley and Ouachita Mountains. Much of the Osage Section can be described as scarped plains. The topography ranges from nearly featureless plain and low escarpments to bold escarpments that rise as much as 600 feet above the adjacent plains.

Bedrock in the southeastern portion of the Osage Section consists of mostly thinly to massively bedded sandstone, shale, siltstone, and limestone of Pennsylvanian Age. The sandstone beds are hard and well cemented, and the shales and siltstones are compact and dense. Units identified in the Muskogee area include the Hartshorne Sandstone, the McCurtain Shale, and the Warner Sandstone, in ascending order. Permeability in this type of bedrock is generally low and groundwater movement depends on secondary porosity (joints and fractures) rather than primary porosity (intergranular).

Although the subject site is physically located in the Osage Section, the regional structural geology is influenced by its proximity to the Boston Mountains Section of the Ozark Plateau Physiographic Province and the Arkansas Valley Section of the Ouachita Physiographic Province. The Boston Mountains form a fairly narrow east-west belt at the extreme southern margin of the Ozark Dome (uplift). Rocks of the Boston Mountains Section are early and middle Pennsylvanian in age and are predominantly sandstone and shale. Faulting is conspicuous in the Boston Mountains, particularly in Cherokee and Adair counties of Oklahoma. However, the number and magnitude of these faults rapidly subsides until they are eventually unrecognizable west of the Arkansas River. On the southern margin of the Boston Mountains, near the subject site, bedrock dips steepen rapidly as the strata descend into the synclinorium in the Arkansas Valley to the south.

The Arkansas Valley Section is an east-west belt that extends from Oklahoma to the Coastal Plain in Arkansas. The Arkansas Valley is a trough both topographically and structurally. It is transitional between



the essential homoclinal structure of the south flank of the Boston Mountains to the north and the complexly folded strata of the Ouachita Mountains to the south. Intensity of folding increases from the Ozark Uplift (north) to the Ouachita Mountains (south). Closed folding with an east-west trend characterizes the Arkansas Valley. The structures and associated ridges commonly overlap one another en echelon. Rocks in the Arkansas Valley, with the exception of a few igneous intrusions, are Carboniferous in age and belong mainly to the Atoka, Stanely, and Jackfork groups. The Atoka Group which consists mostly of shale and thin sandstone forms an erosional scarp located approximately 4 miles from the Arkansas River (and the subject site) and is the closest bedrock outcrop. The subject site is located on the northern flank of the Arkansas Valley. Bedrock dips typically are to the south toward the axis of the basin.

### 3.3.2 Soil Characterization

These unconsolidated materials consist of natural soils and heterogeneous fill material. The fill is probably a heterogeneous mixture of man-made materials and reworked natural soils used during the grading of the site. Soil characterization beneath the subject property and the surrounding area was provided by Earth Sciences' report, "Remedial Assessment Northwest Property Area" (Project No. 111, June 1993). General soil characterization consists of terrace deposits having upper surfaces ranging from 20 to 120 feet above the floodplain and border the alluvial deposits in segments on both sides of the Arkansas River. These deposits are composed predominantly of silt, fine sand, coarse sand, and gravel near the base. The city of Muskogee is on a terrace segment that extends north and east of the city to the bank of the Arkansas River.

Alluvium is formed in lenticular segments along the Arkansas River from 1 to 3 miles wide and 3 to 11 miles long which roughly parallel the river flow direction. Deposits of alluvium underlying the floodplain consist of clay, silt, sand, and gravel in proportions that vary locally. A general feature of the alluvium is the gradation in grain size from gravel or coarse-grained sand near the base of the deposit to silt and clay near the surface. The natural soils beneath the subject site consist of alluvial terrace deposits composed predominantly of silty and sandy clay, silt, fine sand, and coarse sand.

### 3.3.3 Hydrogeology

Based on Earth Sciences' June 1993 report, groundwater beneath the site is present in a shallow zone defined at the soil/bedrock interface. Groundwater within the unconsolidated deposits is located at the base of the sediments within the coarse-grained materials. The unconfined saturated sand unit overlying bedrock is laterally persistent across the subject area. Perched zones of saturation were not encountered. Based on the information provided in the June 1993 report, the groundwater divide located in the southern portion of

the Northwest Property within the unconsolidated zone of saturation indicates that groundwater flow beneath the subject property is flowing in a easterly and southerly direction towards the Fansteel facility.

### 3.4 Historical Use Information

#### 3.4.1 Historical Aerial Photographs

Earth Sciences obtained and reviewed one historical aerial photograph for the subject site and the surrounding area. Based on a review of the 1973 aerial photograph (Appendix C), the subject property vacant land occupied by light to moderate vegetation (grass and trees). Surrounding properties are occupied by the following: a roadway, vacant land, and a rectangular-shaped structure to the north; vacant land and roadways to the west; two rectangular-shaped structures, roadways, automobile parking areas, and vacant land; and vacant land, retention ponds, several structures, and roadways to the east and southeast.

One other historical aerial photograph was ordered from National Aerial Resources for the year 1952. Earth Sciences has not received this aerial photograph as of the writing of this report. As soon as Earth Sciences receives this information it will be incorporated as an addendum to this report.

#### 3.4.2 Sanborn Fire Insurance Maps

Earth Sciences researched the availability of Sanborn Fire Insurance (Sanborn) maps in an attempt to gain additional information regarding the extent, if any, of historical commercial and/or industrial development on or in the area of the site. Sanborn maps were published from approximately 1860 to present and are prepared to assist insurance underwriters by describing various physical characteristics of a piece of property, its structures, utilities, and surrounding area. Sanborn maps were prepared for areas which have exhibited a sufficient degree of commercial/industrial development to be of concern to insurance underwriters. No Sanborn maps were available for the subject site or the surrounding area.

#### 3.4.3 Historical Topographic Maps

Earth Sciences obtained and reviewed historical topographic maps for the subject site and the surrounding area. Only one historical topographic map was located for the year 1974. Based on a review of this historical topographic map, the subject property appears to be vacant unoccupied land. Surrounding properties consist of the following: a roadway, vacant land, and a rectangular-shaped structure to the north; a roadway and State Route 165 to the west; a roadway, vacant land, and two rectangular-shaped

structures to the south; and several settling ponds, vacant land, and several structures to the east. A copy of the historical topographic map is provided in Appendix D.

#### 4.0 Information From Site Reconnaissance and Interviews

Earth Sciences' personnel (Mr. Dean M. Steinbach) conducted a visual inspection of the subject site on May 9, 1999. During this visual inspection, the site was evaluated for the potential presence of wetlands; asbestos-containing materials (ACM); PCBs; USTs; ASTs; hazardous waste generation, storage, and/or disposal activities; and other areas of potential environmental concern. Observations were made of the site itself as well as the general surrounding area. The actual presence of hazardous substances on the subject site cannot be confirmed without intrusive sampling.

Earth Sciences has performed the Phase I environmental site assessment of the subject site in conformance with the scope and limitations of ASTM Practice E 1527. Any exceptions to or deletions from this practice have been identified and addressed herein. The following sections detail the site reconnaissance performed by Earth Sciences and provides limited recommendations for the subject site.

##### 4.1 Wetlands

Based on Earth Sciences' site visit, no soils and vegetation indicative of wetlands were identified on the subject property. A formal wetland delineation survey was not performed as part of the assessment.

##### 4.2 ACM

No ACM were observed on the subject property at the time of the site visit.

##### 4.3 PCBs

No PCB-containing electrical or mechanical equipment was observed on the subject property at the time of the site visit.

##### 4.4 USTs

No visible evidence of USTs (i.e., fill pipes, pumps, or vents) were observed on the subject property on the day of the site visit. Site personnel were unaware of any USTs on the subject property, either currently or historically.

##### 4.5 ASTs

No ASTs were observed on the subject property the day of the site visit.

#### 4.6 Drums and Containers

No drums or other containers of regulated or nonregulated materials were observed on the subject property at the time of the site visit.

#### 4.7 Drains and Sumps

No floor drains or storm water drains were observed on the subject site the day of the site visit.

#### 4.8 Pits, Ponds, or Lagoons

No pits, ponds, lagoons, or hazardous waste disposal areas were observed on the subject property at the time of the site visit. In addition, there was no evidence of filled or disturbed pits, ponds, lagoons, or hazardous waste disposal areas on the subject site at the time of the site visit.

#### 4.9 Stained Soil/Pavement or Distressed Vegetation

No stained soil or distressed vegetation was observed on the subject site the day of the site visit.

#### 4.10 Wells

No wells were observed on the subject site the day of the site visit.

#### 4.11 Remedial Assessments

A remedial assessment and decommissioning survey was conducted on the entire Northwest Property in 1993. The work was conducted to support Fansteel's request to remove the Northwest Property from its existing NRC Materials License. In order to remove the Northwest Property from its NRC license, Fansteel conducted a detailed radioactivity survey on the buildings, land areas, and equipment to demonstrate that radioactive contamination did not exist in excess of the applicable standard for release for unrestricted use contained in the NRC's Regulatory Guideline 1.86. In addition to the radioactivity survey, an environmental study of the entire Northwest Property was conducted to determine the presence and concentration of any chemical contamination from plant operations. Based on the laboratory results, no radiological or chemical impact has occurred to the soils and groundwater beneath the entire Northwest Property. Furthermore, the land and building radiation survey results indicate that the Northwest Property satisfies the requirements for release from its NRC license for unrestricted use.

Based on the radiation survey activities and results, the NRC has released the Northwest Property from the restrictions of Fansteel's Materials License (SMB-911). A copy of Fansteel's most current Materials License SMB-911 is provided in Appendix E.

## 5.0 Conclusions and Recommendations

Based upon the information obtained during the performance of this Phase I environmental assessment and within the limits of the scope of work established for this project, Earth Sciences has found that the subject property does not present a significant environmental concern.

- (1) The subject property is currently owned by Fansteel, and belongs to a much larger parcel of land referred to as the "Northwest Property Area". Based on historical information and assessments conducted on the Northwest Property, no storage of radioactive and nonradioactive materials and none of Fansteel's operations were conducted on the subject property.
- (2) The surrounding adjoining properties east and south of the subject property are also owned by Fansteel. Production activities conducted on the adjoining property east/southeast of the subject property consisted of the following: extraction of tantalum and columbium from raw materials that contained uranium and thorium (radioactive trace constituents); solid residues were stored in impoundments; and the liquid wastes were treated and discharged. Operations conducted on the southern portion of the Northwest Property consisted of the processing of nonradioactive tantalum and columbium powder.
- (3) In 1993, Earth Sciences performed a series of environmental surveys of the entire Northwest Property for the presence of radioactive materials or contamination from Fansteel's former operations. The surveys consisted of field instrument readings of surface/shallow soils and building media and collection of soil and groundwater samples to determine the presence and concentration of any radioactivity and chemical contamination from former plant operations. Based on the field instrument readings and laboratory analyses, no radiological or chemical impacts have occurred to the soils or groundwater beneath the entire Northwest Property. The land and building radiation survey results indicate that the entire Northwest Property satisfies the requirements for release from Fansteel's NRC Materials license for unrestricted use.
- (4) According to the NRC, the entire Northwest Property has been released from the restrictions of Fansteel's Materials License SMB-911.



